

A REVISION OF CALIFORNIAN UMBELLIFERAE

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Field expeditions into all parts of California on the part of the author during a period of many years have brought together a large number of specimens and a large amount of field data concerning native Umbelliferae. This material has been gradually worked up and the results of comparison in the herbarium and the garden have been assembled and organized into the present paper. It is the object here, first, to set forth corrected but more especially new diagnoses of the genera and species, in order that the descriptions may more nearly approximate the status of the plant in the field. The reconstruction, from time to time, of species diagnoses, old as well as new, in order to bring them into harmony with known facts, while laborious and not showy, is nevertheless important, since, under such practice, the written diagnoses constantly approximate the plant in the field and thus tend to stabilize the species concept and render it clearer. In the second place, it is here attempted to define more clearly and precisely the geographic ranges, in the light of our present knowledge of the topography and climatology of the state. In the third place, selected specimens have been cited as representative of the diagnoses and in validation of the indicated ranges. In the fourth place, the more important bibliographic references for each species have been listed, and the references carefully checked as far as possible.

In addition to the great advantages of field expeditions, the writer has also had the privilege of examining the types of many early species at the Herbarium of the Royal Botanic Gardens at Kew, London, particularly those of Douglas, Nuttall and Hartweg, and also a few types at the Gray Herbarium of Harvard University.

From the standpoint of number of species, our three most important genera are *Eryngium*, *Sanicula* and *Lomatium*. *Eryngium* is represented by a very large number of forms which are difficult to segregate as specific units. Ecologically the most representative and wide-spread species is *E. vaseyi* C. & R. Its seeds germinate in the beds of winter pools and develop in early spring a tuft of quill-like or tubular leaves which are distinctly septated. As the waters are dried up by the rising temperatures of April and May, leafy shoots appear which bear broad dorsiventral leaves with variously cleft or toothed margin. Under the heat of the summer period these leaves, especially the lower ones, disappear, and the inflorescence develops and matures into fruiting condition by July or August. There are thus three fairly distinct stages, all of which are profoundly affected by variation in the ecological factors. The leaves vary much in size and outline, the plant varies in habit, and the bracts and bractlets vary in length and toothing. In consequence it is difficult to fix upon characters for reliable differentiae. This

species, *E. vaseyi*, presents a fair or average picture of the various species of the genus in California.

The genus *Sanicula* presents less difficulty, but its representatives show remarkable variation in leaf outline and segmentation and, to a certain degree, in habit. Marked plants in the open, or cultivated plants in the garden, give, however, satisfactory data regarding range of variation in the species of this genus.

Our largest genus, *Lomatium*, is only to a slight degree variable in habit and foliage. For differentiae one must depend in great measure upon the characters of the fruit and its oil-tubes. While the results of variation studies upon the oil-tubes have been incorporated in the diagnoses, it must, however, be noted that even with the best material this character is often unsatisfactory, and reliance upon the number and disposition of the oil-tube structures must be exercised with suitable caution and reserve.

The figures, forty in number, prepared as illustrations for this paper, are entirely original. They have been drawn by Joyce M. Saunders, in certain cases from preliminary studies by Elsie M. Zeile. The accenting of the generic and specific names is the work of Professor C. B. Bradley.

SYNOPSIS OF THE GENERA

A. Fruit bearing prickles, bristles, scales or tubercles.

- Ribs and oil-tubes none.
 Fruit covered with hyaline scales; flowers greenish white or blue; prickly perennial herbs 1. ERYNGIUM.
 Fruit bur-like, covered with hooked prickles.
 Flowers yellow or purple, mostly in head-like clusters; perennials 2. SANICULA.
 Flowers white, in compound umbels; annuals 3. ANTHRISCU.
 Rib present; flowers white.
 Oil-tubes none or obscure.
 Fruit with an elongated beak several times longer than the muriculate body; annuals 4. SCANDIX.
 Fruit not beaked or with a short beak several times shorter than the smooth body; ribs bristly; perennials 5. OSMORRHIZA.
 Oil-tubes present, usually conspicuous.
 Rib armed with bristles.
 Fruit somewhat flattened dorsally; umbel compound 6. DAUCUS.
 Fruit flattened laterally; bristles hooked.
 Umbels subcapitate, opposite the leaves; fruit prickly on one carpel, warty on the other 7. TORILIS.
 Umbels compound, terminal and lateral; fruit prickly on both carpels 8. CAUCALIS.
 Rib not armed, inconspicuous; fruit tuberculate-roughened; umbels irregularly compound 9. APIASTRUM.

B. Fruit not prickly or tuberculate nor scaly (sometimes hairy).

1. *Leaves simple; umbels simple or proliferous.*
 Leaves alternate or in a basal tuft; carpels with filiform ribs; stems creeping; perennials.
 Oil-tubes none; leaves orbicular or peltate 10. HYDROCOTYLE.
 Oil-tubes solitary; leaves consisting of hollow cylindrical petioles 24. LILAEOPSIS.
 Leaves opposite; carpels without ribs; stems slender, weak; annuals 11. BOWLESIA.
2. *Leaves pinnately or ternately compound or decompound; umbels compound.*
 a. Ribs of the fruit not winged; fruit not flattened dorsally, sometimes somewhat laterally flattened.
 Flowers white, rarely pinkish, or at least not yellow.
 Oil-tubes none.
 Fruit linear or elongated ($\frac{1}{2}$ to 1 in. long); stems not dotted 5. OSMORRHIZA.
 Fruit ovate ($1\frac{1}{2}$ lines long); stem purple dotted 12. CONIUM.

Oil-tubes present.

- Oil-tubes solitary in the intervals (see also no. 18).
 - Petals conspicuously unequal; lower leaves with broad leaflets, the upper dissected 13. CORIANDRUM.
 - Petals equal or essentially so.
 - Umbels subsessile in the forks and terminal on the branches 14. APIUM.
 - Umbels terminal on the branches.
 - Bracts 3-parted to the middle into filiform divisions, closely reflexed; upper leaves ternately decompound and dissected 15. AMMI.
 - Bracts entire or merely toothed, spreading or rarely reflexed; leaves pinnate or bipinnate.
 - Leaflets entire; ribs filiform; plants of dry ground or moist meadows 16. CARUM.
 - Leaflets serrate; plants of marshes or stream banks.
 - Ribs corky but distinct.
 - Styles short (about $\frac{1}{2}$ or $\frac{1}{5}$ as long as the fruit); fruit broadly ovate or roundish 18. CUCUTA.
 - Styles long (about $\frac{1}{2}$ as long as the fruit); fruit subcylindric 19. OENANTHE.
 - Ribs confluent, forming a continuous corky covering 20. BERULA.
 - Oil-tubes 2 or more, at least in some of the intervals.
 - Ribs, or some of them, corky.
 - Leaves simply pinnate; stems leafy; ribs all corky; marsh or aquatic plants 21. SIUM.
 - Leaves once or twice ternate, all basal; lateral ribs corky-thickened, the others slender; slopes towards the arid interior 22. OROGENIA.
 - Ribs not corky-thickened.
 - Pedicels of the flowers equal or nearly so; calyx-teeth not rigid.
 - Leaves once to thrice ternate or pinnate; mostly tall plants.
 - Leaflets linear, mostly entire; ribs filiform 17. EULOPHUS.
 - Leaflets ovate, incised; ribs prominent, acute 23. LIGUSTICUM.
 - Leaves pinnate or bipinnate, the divisions or leaflets oblong, entire, alpine dwarf 25. PODISTERA.
 - Pedicels of the sterile flowers surpassing or equaling the fruit; sterile calyx-teeth rigid-subulate, very prominent 26. OREONANA.

Flowers yellow.

- Stems of medium height, the leaves mostly basal; leaflets broad 27. VELAEA.
- Stems very tall, leafy; leaves dissected into filiform segments 28. FOENICULUM.

b. Some or all the ribs of the fruit winged.

- Lateral ribs winged, the dorsal and intermediate ribs filiform; fruit flattened dorsally.
 - Oil-tubes reaching only half way to the base of the fruit; marginal flowers of umbel with radiately enlarged corollas; tall coarse plants 29. HERACLEUM.
 - Oil-tubes as long as the fruit; corollas all alike.
 - Leaves and peduncles arising from the root-crown, or from only a very short proper stem.
 - Lateral wings of fruit corky-thickened; flowers commonly yellow; tall plants with large leaves 30. LEPTOTAENIA.
 - Lateral wings thin; flowers yellow, white or purple; low plants with medium or small leaves 31. LOMATIUM.
 - Stems tall, leafy.
 - Dorsal and intermediate ribs 3; flowers yellow.
 - Leaves pinnate, the leaflets ovate, toothed 32. PASTINACA.
 - Leaves ternately compound and dissected into filiform segments 33. ANETHUM.
 - Dorsal and intermediate ribs apparently 5; leaves simply pinnate; flowers white 34. OXYPOLIS.
 - Lateral, dorsal and intermediate ribs winged or very prominent.
 - Tall plants with leafy stems; flowers white.
 - Umbellets not capitate.
 - Ribs not corky-thickened; fruit flattened dorsally; petioles not inflated.
 - Leaflets incised or deeply toothed; oil-tubes solitary in the intervals 35. CONIOSELINUM.
 - Leaflets not incised, merely serrate or toothed or entire; oil-tubes 1 to 3 in the intervals 36. ANGELICA.
 - Ribs very thick and corky; fruit slightly flattened laterally if at all; petioles inflated 37. COELOPLEURUM.
 - Umbellets capitate; fruit cuneate-obovate, flattened dorsally, pubescent 38. SPHENOSCIADIUM.
 - Mostly low plants, the leaves and peduncles all basal; oil-tubes several in the intervals; flowers white, yellow or purple; fruit flattened dorsally or not at all 39. CYMPTERUS.

1. ERÝNGIUM L. BUTTON SNAKEROOT

Perennials with clustered coarse fibrous roots, often dichotomously branching stems, prickly involucre and often prickly leaves. Leaves opposite, or the upper sometimes alternate, commonly oblanceolate and spinulose-serrate or incised, or the basal, when growing in water, with fistulous petioles and the blade more or

less obsolete. Flowers greenish white or bluish, condensed in heads; heads terminal on the branches or on short peduncles in the forks; bracts spinose, conspicuous; bractlets usually spinose-tipped. Calyx-lobes persistent on the fruit. Fruit covered with whitish thin scales; ribs obsolete. Oil-tubes none or obscure. (Greek name used by Dioscorides.)

- Sepals entire.
- Heads very blue.....1. *E. articulatum*.
 - Heads greenish, seldom blue.
 - Blades of lower cauline leaves about $1\frac{1}{4}$ in. long, the petioles several times as long....2. *E. alismaefolium*.
 - Blades of lower cauline leaves little or not at all exceeded by the petioles.
 - Bracts mostly entire (sometimes with a pair of spiny teeth or bristles).
 - Styles in fruit little or not at all exerted beyond calyx-lobes; bracts and bractlets glabrous.
 - Stem diffusely branched from base; leaves serrate or incised; bracts callous-margined.....3. *E. armatum*.
 - Stem erect, simple below; leaves twice pinnately parted; bracts scarious-winged at base.....4. *E. pinnatisectum*.
 - Styles in fruit conspicuously exerted beyond calyx-lobes; bracts and bractlets puberulent.....5. *E. longistylum*.
 - Bracts more or less spiny-toothed or bristly.
 - Plants prostrate or low-diffuse.
 - Stems thickened, nearly simple, clustered at base; basal leaves pinnatifid.....6. *E. minimum*.
 - Stems slender, freely branched, not clustered at base; basal leaves oblanceolate, spinose-toothed.....7. *E. aristulatum*.
 - Plants erect.
 - Bractlets not spiny-toothed.....8. *E. jepsonii*.
 - Bractlets spiny-toothed.
 - Leaves merely spinose-toothed or somewhat incised; bracts and bractlets spiny-toothed only towards base...9. *E. vaseyi*.
 - Leaves laciniately parted into remote spinulose-toothed segments; bracts and bractlets spiny-toothed except towards tip....10. *E. castrense*.
 -11. *E. globosum*.
- Sepals pinnately 3 to 5-cuspidate.....

1. *E. articulatum* Hook. BLUE-THISTLE. Stem erect, dichotomously branched above, usually with a pedunculate head in the forks, 2 to 3 ft. high; herbage with a strong disagreeable odor; lower leaves fistulous, elongated, jointed, with or without a lanceolate or ovate nearly paralleled-veined entire to spinulose-laciniate blade; upper leaves sometimes opposite, more or less laciniate; heads ovoid, 4 to 8 lines high, blue; bracts narrowly linear-lanceolate, cuspidate-tipped, more or less spinulose-serrate, 6 to 10 lines long, deflexed; bractlets lanceolate, entire, or somewhat spiny-toothed, more or less scarious-margined, surpassing the sepals; sepals lanceolate, $1\frac{1}{2}$ lines long, tapering into a short spine, equaled or surpassed by the styles.—River marshes and marshy meadows: lower San Joaquin River; Sacramento Valley; north to Siskiyou and Modoc Cos.; Oregon to Idaho.

Locs.—Stockton, *Sanford*; Suisun Marshes, *Jepson*; Hamilton, Glenn Co., *Heller* 11558; Upper Fall River Valley, *Jepson* 5756; Sisson, *C. F. Baker* 3819 (cauline leaves like those in *E. alismaefolium*).

Var. *BAKERI* Jepson n. var. Stems simple for more than half their length, then sparsely branched, 1 to $1\frac{1}{2}$ ft. high; leaf blade of basal leaves ovate, $1\frac{3}{4}$ to 2 in. long, the petiole much elongated; heads ovate to globose, bluish, on longish peduncles, 4 to 5 lines high; bracts linear-lanceolate, pinnately spinescent, longer than the heads, spreading or often deflexed; bractlets with a pair of spinose teeth above the middle, scarious-margined at base, equaling or slightly exceeding the sepals; sepals ovate, $\frac{3}{4}$ line long, tapering rather abruptly into a short cusp, exceeded by the styles.—Modoc Co. This is an apparent intergrade to *E. alismaefolium* Greene.

Locs.—Egg Lake, *M. S. Baker* (type); Forestdale, *Baker & Nutting* (heads $5\frac{1}{2}$ lines long, terminal bractlets prominent); Little Grizzly ranger sta., Warner Mts., *L. S. Smith* 163.

Refs.—ERYNGIUM ARTICULATUM Hook. Jour. Lond. Bot. 6:232 (1847), "stony edges of the Spokane River, and Skitsoe and Coeur d'Alene lakes," *Ida.*, *Geyer* 583; *Jepson*, Fl. W. Mid. Cal. 344 (1901). *E. harknessii* Curran, Bull. Cal. Acad.

1:153 (1885), type loc. Suisun Marshes, *Harkness*. Var. *BAKERI* Jepson, type loc. Egg Lake, near Larges, Modoc Co., *M. S. Baker*, Aug. 12, 1899.

2. *E. alismaefolium* Greene. Main stem 1 to 2 in. high, then parted into 3 to 5 diffuse dichotomous branches, at first much shorter than the leaves, later often exceeding them; basal leaves $\frac{1}{2}$ to $1\frac{1}{4}$ ft. long, consisting of elongated petioles with or without short ($1\frac{1}{4}$ in. long) blades; petioles terete, jointed, passing above into flat spinose ones without joints; upper leaves similar but much smaller; heads usually pedunculate, nearly globose, 3 to $3\frac{1}{2}$ lines high; bracts subulate-lanceolate, usually somewhat longer than the heads, 4 to 5 lines long, with or without a few spinose bristles, somewhat scarious-margined at base; bractlets subulate-lanceolate, a little exceeding the flowers, with conspicuous scarious margin below (broadening downward), with or without a few bristles; sepals ovate-oblong, scarious margined, $\frac{1}{2}$ line long, tapering into a cuspidate-bristly tip; styles longer than the sepals.—Modoc Co.

Loc.—Egg Lake, *M. S. Baker*, *Baker & Nutting*.

Refs.—*ERYNGIUM ALISMAEFOLIUM* Greene, *Erythra* 3:64 (1895), type loc. Egg Lake, Modoc Co., *Baker & Nutting*.

3. *E. armatum* C. & R. COAST *ERYNGO*. Fig. 1. Diffusely branching, the stems 3 to 5 or 10 in. long; leaves broadly oblanceolate, incised or merely serrate, the teeth spinose; bracts and bractlets very prominent, broadly lanceolate, strongly spinose-tipped, with a callous margin, entire or with a pair of spinulose teeth below, sometimes scarious-winged at the very base, 3 to 7 lines long; calyx lobes ovate, $\frac{3}{4}$ line long, usually exceeding the styles, narrowed at apex into a sharp point or cusp less than half as long.—Lowlands near the coast from Monterey Co. to Humboldt Co.; often abundant.

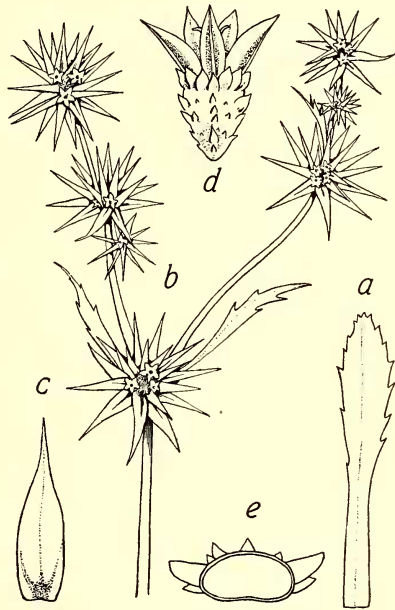
Locs.—Pacific Grove, *Jepson* 1163; Moss Beach, *K. Brandegee* (bracts very broad at base); Berkeley, *Harriet Walker* 197; Pt. Reyes, *Jepson*; Petaluma, *Congdon*; Ft. Bragg, *W. C. Mathews* 163; Newport, Mendocino Co., *Jepson* 2212 (styles exerted beyond calyx lobes; bracts entire or with a spinulose tooth on each side); Shelter Cove, Humboldt Co., *Tracy* 4995 (heads bluish tinged).

Refs.—*ERYNGIUM ARMATUM* C. & R. Bot. Gaz. 13:141 (1888); *Jepson*, Fl. W. Mid. Cal. 343 (1901).

E. petiolatum var. *armatum* Wats. Bot. Cal. 1:255 (1876), based on spms. from Monterey Co. to Humboldt Co. (*Brewer, Samuels, Kellogg*).

E. HARMSIANUM Wolff in Fedde, Rep. Nov. Sp. 8:415 (1910), type from Cal., *Anderson*; related to *E. armatum*; bractlets auriculate-scarious at base (ex. char.), but so are they generally in our species.

4. *E. pinnatisectum* Jepson n. sp. Stems erect, branching above, 8 to 14 in. high; basal leaves 6 in. long, tapering into a flat winged petiole, pinnately parted into narrow rather remote segments, these spinulose-toothed or -parted; upper leaves similar or merely spinose-toothed, the petiole short or lacking; heads $3\frac{1}{2}$ to 4 lines high; bracts entire, 4 to 5 lines long, with wide scarious margin at



1. *Eryngium armatum* C. & R.; a, leaf x $\frac{1}{2}$; b, infl. x $\frac{3}{4}$; c, bract x 4; d, fr. x 4; e, sect. carp. x 7.

base forming a lobe or tooth above; bractlets shorter, similar; sepals lanceolate, 1 line long, tapering into a spine about $\frac{1}{2}$ as long; styles exceeded by sepals.—Sierra Nevada foothills in Tuolumne Co.

Loc.—Duffield Cañon, Soulsbyville, *Jepson* 7690, type (fruit unknown).

5. *E. longistylum* C. & R. Low (4 to 8 in. high), branching throughout and spreading; basal leaves narrow, pinnately cut into distant almost spine-like segments; heads globose, about $1\frac{3}{4}$ lines high; bracts narrowly lanceolate, spreading, minutely puberulent, much longer than the heads, $2\frac{3}{4}$ to $3\frac{3}{4}$ lines long, mostly entire, scarios-margined at base; bractlets similar, but narrower, and with broader scarios margins at base; sepals lanceolate, scarios-margined, $\frac{1}{2}$ line long, tapering above into a weak acuminate tip; styles very much longer than the sepals.—Western San Luis Obispo Co.

Loc.—San Simeon, *Curran*.

Refs.—ERYNGIUM LONGISTYLM C. & R. Contrib. U. S. Nat. Herb. 7:55 (1900), type loc. San Simeon, San Luis Obispo Co., *Curran*.

6. *E. minimum* C. & R. Low, depressed-tufted, the stems several to many and the leaves mostly basal; stems nearly simple, thickened toward the base and markedly retrocurved, 1 to 4 in. long; leaves 2 to 6 in. long, merely cleft and toothed to pinnately divided with cleft or toothed ovate segments, the teeth and petioles more or less spinose; heads on very short peduncles, nearly globose, $2\frac{1}{2}$ to $3\frac{1}{2}$ lines high; bracts broadly lanceolate, equaling or slightly exceeding the heads, the lower $\frac{2}{3}$ with spinose bristles; bractlets broadly linear-lanceolate, a little longer than the flowers, with a conspicuous scarios margin below, at the top of which and just above are a few bristles; sepals ovate, scarios-margined, $\frac{1}{2}$ line long, with an abruptly cuspidate-bristly tip about as long; styles exceeding the sepals.—Northern Sierra Nevada (Nevada Co. to Plumas Co.)

Locs.—Donner Lake, *Sonne, Heller* 7061; Plumas Co., *R. M. Austin*.

Refs.—ERYNGIUM MINIMUM C. & R. Contrib. U. S. Nat. Herb. 7:54 (1900). *E. petiolatum* var. *minimum* C. & R. Rev. N. Am. Umbell. 98 (1888), type loc. Donner Lake, *Sonne*. *E. articulatum* var. *microcephalum* C. & R. l. c. 99, type loc. Plumas Co., *R. M. Austin*.

7. *E. aristulatum* Jepson. Prostrate or low-diffuse, very slender, the stems 10 to 15 in. in length; basal leaves tapering into a long petiole, 4 in. long (including the petiole), the short blade spinose-toothed and with a few lanceolate segments; cauline leaves opposite, sessile, spinulose-serrate; heads very numerous, $2\frac{1}{2}$ to $3\frac{1}{2}$ lines long; bracts exceeding the head, about $4\frac{1}{2}$ lines long, densely spinose at base; bractlets spinose, the body narrowly lanceolate, inversely sagittate-winged from the base upward, the lobes of the wings thus forming sinuses, in each of which are borne 1 to 3 awns surpassing the breadth of the wing; calyx lobes ovate-lanceolate, hyaline-margined, 1 line long, tapering into a cuspidate-bristly tip, exceeded by the long styles.—Dry lake beds, Lake Co.

Locs.—Mt. Konocti (Uncle Sam Mt.), *Jepson*; Boggs Lake, Bottle Glass Mt., *K. Brandegee*; Scotts Valley, *Tracy* 2375 (stems somewhat retrocurved, apparently not prostrate, bracts much longer than heads, sepals rather abruptly cuspidate).

Refs.—ERYNGIUM ARISTULATUM Jepson, *Erythra* 1:62 (1893), type loc. mts. s. of Uncle Sam Mt., Lake Co., *Jepson*.

8. *E. jepsonii* C. & R. BUTTON-THISTLE. Plants growing in shallow vernal pools, the earliest leaves all basal and consisting of terete hollow pointed petioles, $\frac{1}{2}$ to $1\frac{1}{2}$ ft. long, these disappearing with the drying up of the pools, and leafy stems arising; stems slender, freely branching, $1\frac{1}{4}$ to $1\frac{3}{4}$ ft. high; leaves oblanceolate, spinulose, sometimes incised, the lower narrowed at base to a slender spinulose petiole, the upper short-petioled or sessile; heads 3 to $3\frac{1}{2}$ lines high, surpassed by the bracts; bracts rigid, 4 to 10 lines long, with few short bristles at base; bractlets lanceolate, with scarios margin at base, broader upwards, not spinulose; sepals oblong or lanceolate, 1 line long, narrowed abruptly into a spine less than half as long, exceeded by the long styles.—Low places in valley fields and flats in the hills, Napa Co. to Santa Clara Co.

Locs.—Yountville, *Jepson*; Orinda Park, Contra Costa Co., *Jepson*; Berryessa, Santa Clara Co., *R. J. Smith* 35.

Var. *PARISHII* Jepson n. comb. Stems slender, erect or spreading, much branched at base, $\frac{1}{3}$ to $1\frac{1}{3}$ ft. high; basal leaves laciniate-toothed or parted into remote spinose-toothed segments, tapering into a long somewhat spiny-toothed petiole; inflorescence beginning near the base and diffusely branching, the heads about $2\frac{3}{4}$ lines high; bracts narrow and rigid, with a few spinose bristles and with or without a narrow scarious margin at base, $3\frac{1}{2}$ to 6 lines long; bractlets similar but with a short broad scarious margin below, usually without bristles; sepals ovate, $\frac{1}{2}$ line long, tapering above into a cuspidate-bristly tip.—Sandy ground, San Luis Obispo Co. to San Diego Co. and Lower California.

Locs.—San Diego, *Jepson* 1599; Oceanside, *Parish* 4436.

Refs.—*ERYNGIUM JEPSONII* C. & R. Contrib. U. S. Nat. Herb. 7:54 (1900); type loc. near Orinda Park, Contra Costa Co., *Jepson* in 1895. *E. californicum* Jepson, Fl. W. Mid. Cal. 343 (1901), type loc. Yountville, *Jepson*. Var. *PARISHII* Jepson. *E. parishii* C. & R. l. c. 57, type loc. Oceanside, *Parish* 4436.

E. ELONGATUM C. & R. Contrib. U. S. Nat. Herb. 7:53 (1900), type loc. near San Francisco, *Vasey*. Upper leaves tapering into spinulose-winged petioles; heads 7 lines long; bracts weak and becoming reflexed; scarious margin of bractlets broader toward base (ex. char.). A specimen from Wells Hill, upper Vaca Valley, *Jepson*, referred doubtfully by C. & R. l. c., to this species, has sepals (about 1 line long) tipped with a weak spine of about equal length.

9. *E. vaseyi* C. & R. COYOTE-THISTLE. Fig. 2. Plants growing in shallow vernal pools and showing two vegetative stages: earliest leaves all terete, jointed, and basal, disappearing with the drying up of the pools and succeeded by leafy stems; stems stout, erect, more or less branching, commonly 8 to 13 in. (or sometimes 2 ft.) high; lower leaves narrowly oblanceolate, spinulose, somewhat incised or bearing small lanceolate lobes below, 4 to 8 in. long, the upper much shorter; heads $3\frac{1}{2}$ (or $2\frac{1}{2}$ lines) high; bracts spinose, spinulose toward the base, 6 to 10 lines long, much surpassing the bractlets; bractlets similar, surpassing the flowers; fruit with abruptly cuspidate calyx-lobes longer than the short styles.—Low places in fields, Sacramento Valley, west to Mendocino Co. and south to Monterey Co. May-June.

Locs.—Red Bluff, comm. *Ethel W. Wickes*; Vacaville, *Jepson*; Little Oak, Solano Co., *Jepson*; Elmira, *Jepson*; Middle Eel River to Round Valley, *Jepson*. Closely allied is the var. *OBLANCEOLATUM* Jepson n. comb. Bracts with conspicuous scarious margin.—Solano and Napa Cos. to San Diego Co.: Vanden, Solano Co., *Jepson*; St. Helena, *Jepson*; Yountville, *Jepson*; Madrone, Santa Clara Co., *Jepson*; San Luis Obispo, *Jepson* 3070; San Diego, *T. Brandege* 1628.

Refs.—*ERYNGIUM VASEYI* C. & R. Bot. Gaz. 13:142 (1888), type loc., San Antonio River, Monterey Co., *Vasey* 222; *Jepson*, Fl. W. Mid. Cal. 343 (1901). Var. *OBLANCEOLATUM* Jepson. *E. oblanceolatum* C. & R. l. c. 7:56 (1900), type loc. Sonoma Valley, *Torrey* 159.



2. *Eryngium vaseyi* C. & R.; a, plant x $\frac{1}{4}$; b, leaves x $\frac{1}{4}$; c, fr. branch x $\frac{1}{2}$; d, fr. x 3; e, sect. x 7; f, bractlet x 2.

10. *E. castrénse* Jepson n. sp. Fig. 3. Stem stout, very erect, simple below, branched above, $1\frac{1}{2}$ to $1\frac{3}{4}$ ft. high; cauline leaves laciniately divided into rather remote very narrow segments, these again cleft or toothed, the margin of the divisions and the ligulate rachis spinose; leaves at the upper forks bracteose-foliaceous, pinnately spinose-cleft, somewhat recurving, $1\frac{1}{4}$ to $1\frac{1}{2}$ in. long; heads mostly short-peduncled, 4 to 5 lines high, twice exceeded by the bractlets; bracts moderately rigid, pinnately spiny-toothed except toward tip, at base more or less scarious margined and densely spinose dorsally, $\frac{3}{4}$ to 1 in. long; bractlets similar but with broadly scarious margined base which encloses the fruit; sepals about 1 line long, tapering into a short spine.—Northern Sierra Nevada foothills from Tuolumne Co. to Butte Co.

Locs.—Chinese Camp, Tuolumne Co., *Jepson* 6319 (type); Pentz, Butte Co., *Heller* 11472 (stout; heads 6 lines high).

Var. *VALLICOLUM* Jepson n. var. Bracts and bractlets shorter and less markedly spinescent, in this character approaching *E. vaseyi*.—Sierra Nevada foothills from Mariposa Co. to Butte Co.



3. *Eryngium castrénse* Jepson; a, fr. branchlet $\times \frac{1}{2}$; b, leaf $\times \frac{1}{2}$; c, bractlet $\times 1\frac{1}{2}$; d, fr. $\times 5$; e, sect. carp. $\times 12$.

long, pinnately 3 to 5 spiny-toothed (rarely entire), the apical spine $\frac{1}{2}$ line long; styles scarcely exerted; fruit $1\frac{1}{2}$ lines long.—Flats in and near the Sierra Nevada foothills in Tulare Co.

Locs.—Kaweah, *Geo. B. Grant* 2894 (immature, some of the heads sessile); Lemon Cove *Jepson* 558 (heads 6 to 7 lines high; bractlets with 1 to 3 spines at upper edge of scarious margin, a little exceeding the head); Exeter, *K. Brandegee* (type).

Var. *MEDIUM* Jepson n. var. Bractlets conspicuously exerted from the heads, in this respect approaching *E. vaseyi*.—Cathay foothills, Mariposa Co., *Jepson* 8409 (one individual with spiny main stem).

Locs.—Escalon, San Joaquin Valley, *Jepson* (type); Chico, *R. M. Austin* 826 (leaves more coarsely lacinate and less spiny).

11. *E. globosum* Jepson n. sp. Stems 1 to several from base, branching above, 14 to 20 in. high; basal leaves pinnately divided into narrow distant segments, these more or less spinose-toothed or cleft, the petioles spinose-winged and at base somewhat clasping, the entire leaf 5 in. long; cauline leaves similar but smaller with short spinosely winged petiole, the uppermost more or less bracteose, very spiny at base; heads remarkably globose, mostly on short stout peduncles, 5 lines in diameter, not exceeded by the bractlets except the terminal ones; bracts rigid, spine-tipped and pinnately spinose, somewhat scarious at base, 4 to $5\frac{1}{2}$ lines long; bractlets pinnately 2 or 3-spinose, with broad scarious margin at base, the margin 1 or 2-spinose above; lateral bractlets equaling the flowers, the terminal ones much longer, all falling with the fruit; sepals ovate, 1 line

2. *SANÍCULA* L. SNAKE-ROOT

Glabrous perennials with naked or few leaved stems, usually much divided leaves, and irregularly compound, few-rayed umbels. Involucres of leaf-like toothed bracts. Involucels of small usually entire bractlets. Flowers greenish, yellow or purple, of two sorts, perfect (fertile) and staminate (sterile), both kinds in the same umbellet, the staminate often pediceled. Umbellets capitate and here called "heads." Calyx teeth slightly foliaceous, persistent. Fruit subglobose or obovoid, without ribs, densely covered with tubercles which often end in hooked prickles. Oil-tubes many and irregularly distributed. (Diminutive, derived from Latin sanare, to heal; certain species used in medicine.)

4. *Sanicula arctopoides* H. & A.; fl. head and leaf x 2.

A. Fruit pediceled or stipitate; leaves palmately lobed or divided; stem or stems from a stoutish tap-root.

- Bractlets conspicuous, much exceeding the heads; plants prostrate or decumbent.....1. *S. arctopoides*.
 Bractlets inconspicuous, not exceeding the heads; plants erect.
 Leaf divisions broad, not toothed to the very base; common.....2. *S. menziesii*.
 Leaf divisions narrow, decurrent below into a conspicuously toothed rachis; rare.....3. *S. arguta*.

B. Fruit neither pediceled nor stipitate.

- Stem or stems from the more or less thickened crown of a tap root.
 Flowers purple (yellow in the vars.); leaves bipinnatifid, the main divisions decurrent on the toothed rachis.....4. *S. bipinnatifida*.
 Flowers yellow.
 Leaves entire or some 3-parted; S. F. Bay.....5. *S. maritima*.

Leaves not entire.

Leaves palmately cleft or divided, the main divisions confluent below; coast species.....6. *S. laciniata*.

Leaves ternate, the main divisions on distinct petiolules; Sierra Nevada, San Bernardino Mts.

Plants low, the spreading peduncles arising in a cluster from near the base.....7. *S. nevadensis*.

Plants erect, the peduncles arising singly along the stem.....8. *S. septentrionalis*.

Stems from a tuberous root.

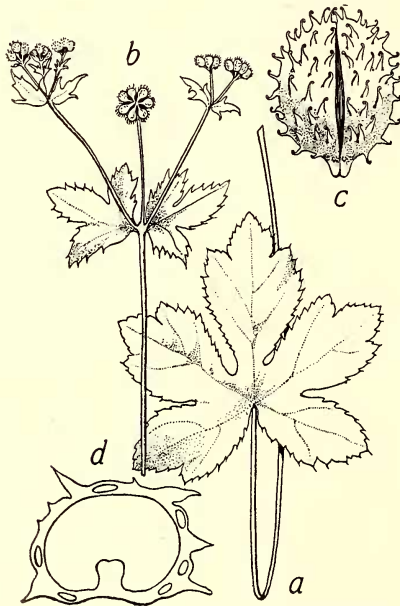
Leaves twice or thrice pinnate, of distinct small leaflets; fruit tuberculate, the tubercles tipped with hooked bristles; tuber vertically elongated.....9. *S. bipinnata*.

Leaves twice or thrice ternate, then pinnately dissected.

Tuber globose; fruit tuberculate, not bristly; flowers yellow.....10. *S. tuberosa*.

Tuber elongated, fleshy, branched below; fruit with its upper tubercles tipped with hooked bristles; flowers salmon color.....11. *S. saxatilis*.

1. *S. árctopoides* H. & A. FOOTSTEPS-OF-SPRING. Fig. 4. Prostrate or decumbent, the plants 4 to 8 inches broad, conspicuous because of the yellowish foliage; main stem from a tap root, very short, bearing a tuft of leaves and several divergent naked branches often longer than the leaves, each branch bearing an umbel of 1 to 4 rays; rays short or as much as 5 inches long; leaves 2 to 2½ inches broad, 2 to 4½ inches long, including the broadly margined petiole, palmately parted into 3 divisions which are again cleft, the whole margin laciniately cut into slender unequal teeth, almost as if fringed, or again, the lanceolate spreading segments subentire; bracts similar; heads 3 lines in diameter, surrounded by conspicuous involuclucels of 8 to 13 oblong entire bractlets 5 to 7 lines long, or 4 or 5 much shorter than the others; flowers yellow; fruit 1 to 1½ lines long, naked at base, with strong bristles above.—Open or brushy hills of the seaward Coast Ranges from Monterey to Humboldt Co. and northward to British Columbia. Also called Yellow Mats.



5. *Sanicula menziesii* H. & A.; a, leaf x ½; b, fr. branchlet x ½; c, fr. x 5; d, sect. carp. x 6.

Locs.—Monterey, *Jepson* 2989; Santa Cruz, *Setchell* (leaf segments very broad); Burlingame, San Mateo Co., *Inez Ray Smith* (leaf divisions and teeth broad to very narrow); Lake San Andreas, *Jepson* 9535; Lake Merced, San Francisco, *Tracy* 1777; Olema, *Jepson*; Inverness, *Jepson* 501; betw. Stewarts Pt. and Sea View, Sonoma Co., *M. S. Baker* 6; Mendocino, *H. E. Brown* 734 (leaf segments very broad); Samoa, Humboldt Bay, *Tracy* 1018 (main stem 2 in. long).

Refs.—*SANICULA ARCTOPOIDES* H. & A. Bot. Beech. 141 (1832), type from Cal., *Lay and Collie*; Hook. Fl. Bor. Am. 1:258, pl. 91 (1834); *Jepson*, Fl. W. Mid. Cal. 344 (1901); *Wolf* in *Engler Pflz.* 4²²⁵:71, Fig. 12 (1913)

2. *S. menziesii* H. & A. GAMBLE WEED. Fig. 5. Stem 1 to 3½ feet high, from a stoutish tap-root, simple below, paniculately branching above; leaves round-cordate in outline, 1 to 3 inches broad, palmately and deeply 3 to 5-lobed, the broad segments sharply lobed or incised, with mucronate teeth; rays few, ¼ to 2 inches long; bracts small, leaf-like; bractlets 6 to 8, small, entire; flowers yellow, the sterile ones

short-pediceled or nearly sessile; fruit covered with strong bristles, $1\frac{1}{2}$ lines long, distinctly stipitate, 4 to 9 in each head, at length divergent.—Shady woods of the foothills from coastal Southern California north through both the Coast Ranges and Sierra Nevada to British Columbia.

Locs.—Waterman Cañon, San Bernardino Mts., *Parish*; Ojai Valley, *Hubby* 3; Fort Tejon, Kern Co., *Davy* 2363; Pacific Grove, *Heller* 6824; Stanford, *C. F. Baker* 714; Berkeley, *Jepson* 6225; Pine Cañon, Mt. Diablo, *Chandler* 952; Calistoga, *Jepson*; Miyakima Range (se. of Ukiah), *Jepson* 3019; Comptche, Mendocino Co., *Harriet Walker* 264; Buck Mt., Humboldt Co., *Tracy* 2748; Crane Creek, w. Tehama Co., *Jepson*; Vina, Tehama Co., *Heller* 11332; Marysville Buttes, *Jepson*; Gwin Mine, Calaveras Co., *Jepson* 1764; Mariposa Co. (*Zoe* 3:29). Not known in the Sierra Nevada foothills from Madera Co. to Kern Co.

Var. *NUDICAULIS* Jepson n. comb. Branches about 10, sub-basal, somewhat scapiform; leaves long-petioled, thinnish, less deeply parted, sinuses more nearly closed and the segments less lobed.—Coast Ranges, *Douglas*; Amador Co., 900 ft., *Hansen* 1451. Var. *PEDATA* Jepson n. var. Robust, 3 to 5 ft. high; leaves thickish, dark green, pedately divided into cuneate segments (especially the cauline), 3 to 4 in. broad, the teeth bristle-tipped.—North Coast Ranges: Elk Mt., Lake Co., *Tracy* 2274; Calistoga, *Jepson* (type). Var. *FOLIACEA* Jepson n. var. Low but very leafy, the bracteal leaves very large.—San Francisco Bay, *Hartweg* 199; Kelseyville, Lake Co., *Irwin* 127 (type).

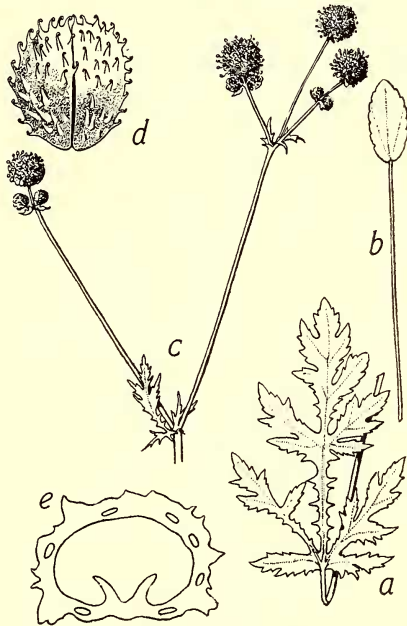
Refs.—*SANICULA MENZIESII* H. & A. Bot. Beech. 142 (1832), type from Cal., *Lay & Collie*; Hook. Fl. Bor. Am. 1:258, t. 90 (1834), *Jepson*, Fl. W. Mid. Cal. 345 (1901). Var. *NUDICAULIS* Jepson. S. nudicaulis H. & A. l. c. 347 (1840), type from Cal., *Douglas*.

3. *S. arguta* Greene. Stem sparingly branched, from the crown of a thickened tap root, 8 to 14 inches high; leaves mainly basal, 1 to 3 inches long, palmately 5- to 7-divided, the middle division largest and often distant, the lower pair of divisions smaller than the lateral pair, all more or less pinnately parted or cleft and toothed and each decurrent to the base, forming a broad toothed wing; ultimate segments 2 to 3 lines broad; midribs and upper side of petioles minutely glandular; petioles 2 to 5 inches long; cauline and bracteal leaves reduced or sometimes large; rays 3 to 5 in an umbel, 1 to 4 inches long; flowers yellow, the heads 2 or 3 lines broad; bractlets membranaceous, oblong, acute, not exceeding the heads; fruit prickly, $2\frac{1}{2}$ lines long, stipitate.—Coastal Southern California.

Locs.—Saugus, *Davy*; Pasadena, *Geo. B. Grant* 1174a; Santa Catalina Isl., *Blanche Trask* in 1903 (fl. & fr.); Santa Barbara, *Elmer* 3930; Ojai Valley, *F. W. Hubby* 14; San Diego, *Jepson* 6664; Escondido, *Abrams* 3353.

Refs.—*SANICULA ARGUTA* Greene; C. & R. Contrib. U. S. Nat. Herb. 7:36 (1900), type loc. San Diego, *Pringle*; Wolff in Engler, Pflzr. 4²²⁸:73 (1913).

4. *S. bipinnatifida* Dougl. PURPLE SANICLE. Fig. 6. Plants $\frac{1}{2}$ to 1 foot high, the herbage disposed to be purplish; tap root deep-seated,



6. *Sanicula bipinnatifida* Dougl.; a, typical leaf x $\frac{1}{2}$; b, early leaf x 3; c, infl. x $\frac{1}{2}$; d, fr. x 3; e, sect. carp. x 6.

its thickened multicapital crown bearing a cluster of leaves and several stems which are leafy mainly or wholly toward the base; leaves $2\frac{1}{2}$ to 4 inches long, mostly triangular in outline, pinnately 3 to 7-parted, the divisions distant, decurrent on the rachis as a toothed wing, and cut into oblong or ovate unequally toothed or serrate lobes; flowers purple, the sterile pediceled, borne in dense heads $2\frac{1}{2}$ to 4 lines in diameter; umbels irregular, with long or short rays, small leaf-like bracts and small lanceolate bractlets; fruit covered all over with bristles.—Grassy slopes in the hills: Coast Ranges and Sierra Nevada foothills, southward to Southern California and northward to British Columbia. May-June.

Locs.—Sierra Nevada: Goose Valley, Shasta Co., *Baker & Nutting*; Oroville, *Heller* 11,206; New York Ravine, Eldorado Co., *K. Brandegee*; Gwin Mine, Calaveras Co., *Jepson* 1782; Columbia, Tuolumne Co., *Jepson* 6289; Mariposa, *Congdon*; Rowen, Tehachapi Mts., *Jepson* 6712, 6729; Tulare, *Davy*. Coast Ranges: Rosewood, w. Tehama Co., *Jepson*; Alton, Humboldt Co., *Tracy* 4478; Round Valley, Mendocino Co., *Westerman*; Leesville, Colusa Co., *T. Brandegee*; Kelseyville, Lake Co., *Irwin* 28; Vacaville, *Jepson*; Chiles Creek hills, Napa Range, *Jepson* 6267; Violet sta., Vacaville, *Jepson* 1200; Mt. Hamilton, *Jepson* 4212; Coyote Creek, Santa Clara Co., *Jepson*; San Luis Obispo Co., *Barber*. Southern California: San Bernardino, *Parish*; Cuyamaca Mts., *Hall*; El Cajon, San Diego Co., *T. Brandegee*.

Leaf multimorphism.—During the course of development from the seedling to the mature plant the leaf shows a considerable range of variation in size, shape and segmentation, while in many individuals this range of variation is rather remarkable. The successive phases are as follows: The earliest leaves are simple, suborbicular, the margin minutely or obscurely crenulate, rarely 3-lobed; next come leaves which are elliptical to oblong-ovate, serrulate to deeply serrate; in the third phase they are broadly ovate in outline, deeply cleft towards the base so as to be trilobate, the terminal lobe much the largest, all the lobes coarsely crenate-serrate; in the fourth phase the 3 main lobes are deeply cleft or somewhat lobate; in the fifth phase the leaf is pinnately divided into 5 to 7 ovate lobes, each pinnately more or less toothed or lobed; finally, the divisions of the pinnate leaf are deeply pinnatifid with narrow toothed segments. The above note rests on the following specimens: Columbia, Tuolumne Co., *Jepson* 6289; Claremont Cañon, Berkeley, *Lewis & Robinson*.

Var. FLAVA *Jepson* n. var. Leaves mostly light green with broad primary divisions ($\frac{3}{4}$ to $1\frac{1}{2}$ inches wide); flowers yellow.—Northern Sierra Nevada: Betw. Clear Creek and Paradise, Butte Co., *Heller & Brown* 5539; Marston sta., Plumas Co., *Heller* 10,839 (type). Little Chico Creek, *R. M. Austin*, is a purple flowered form. Var. NEMORALIS *Jepson* n. comb. Winged rachis entire or sparsely denticulate; flowers yellow.—Northern Sierra Nevada: Merced Big Trees and Yosemite Valley, *Bolander*; New York Falls, Amador Co., *Hansen* 1298 (flowers yellow, rachis very sparsely toothed); Kress, Nevada Co., *Hall & Essig* 10,196 (rachis-winged toothed in some cases); Columbia, *A. L. Grant* 681 (only portions of the winged rachis entire).

Refs.—SANICULA BIPINNATIFIDA *Dougl.* *Hook. Fl. Bor. Am.* 1:258, t. 92 (1834), type loc. Ft. Vancouver on the Columbia River, *Douglas, Scouler*; *Jepson Fl. W. Mid. Cal.* 345 (1901). Var. FLAVA *Jepson*. Var. NEMORALIS *Jepson*. *S. nemoralis* *Greene, Erythea* 1:6 (1893), type loc. Big Trees and Yosemite Valley, *Bolander*.

5. *S. maritima* *Kellogg*. DOBIE SANICLE. Plants 10 to 12 inches high, the stout stem from a much-thickened root; basal leaves rather numerous, elliptical to orbicular, entire or slightly serrate, 1 to 2 inches long, on petioles 4 to 6 inches long; cauline leaves few, 3-parted into obovate or roundish divisions (as are sometimes the basal leaves), with sub-entire or coarsely toothed margins; peduncles few, elongated; umbel with 1 to 4 rays 1 to $2\frac{1}{2}$ inches long; involucre of leaf-like bracts; involucre of many small lanceolate bractlets; flowers yellow, the sterile ones short-pediceled; fruit bristly, somewhat naked below, $1\frac{1}{2}$ lines long; seed-face concave with a very prominent median longitudinal ridge.—Local species of low and wet adobe lands in the vicinity of salt-marshes bordering San Francisco Bay.

Locs.—Potrero, San Francisco, *E. Cannon*; Alameda, *Greene*.

Refs.—SANICULA MARITIMA Kellogg; Wats. Bot. Cal. 2:451 (1880), type loc. near the coast about San Francisco, *Kellogg*.

6. *S. lacinia* H. & A. COAST SANICLE. Plants 6 to 13 inches high; stem from a medium tap root, the branches few and disposed to diverge; leaves mainly basal, roundish in outline, $\frac{1}{2}$ to 1 inch long, palmately 3-cleft or parted, the divisions incisely lobed or laciniate with spreading teeth, their petioles 1 to 2 inches long; upper leaves and foliaceous involucre similar but reduced; umbel with 2 to 5 unequal rays ($\frac{1}{2}$ to $1\frac{1}{2}$ inches long) or 1 or 2 of the rays again umbellate; flowers yellow, subtended by an involucre of oblong-ovate or lanceolate bractlets 1 line long; sterile flowers long-pedicelated; fruit prickly, somewhat naked below, $1\frac{1}{2}$ lines long.—Slopes of the coast hills from Humboldt Co. to Monterey Co. Apr.

Locs.—Humboldt Co. (Bot. Cal. 1:256); Navarro, Mendocino Co., *Edith Byxbee* (earlier leaves sometimes circular-cordate, nearly entire); Franz Valley grade, nw. Napa Co., *Jepson*; Mt. Tamalpais, *Jepson* 1191; Stanford, *C. F. Baker*; Monterey, *Jepson* 2988.

Var. SERPENTINA *Jepson* n. comb. Leaves 1 to $1\frac{1}{2}$ inches long, palmately 3-parted, or divided, the lobes pinnately parted into often remote lanceolate segments, these entire or laciniately toothed.—Monterey Co. to Marin Co.

Locs.—Pacific Grove, *Heller* 6479; Portola, San Mateo Co., *Elmer* 4498; Liberty, Marin Co., *Chestnut & Drew*.

Refs.—SANICULA LACINIATA H. & A. Bot. Beech. 347 (1840), type from Cal., *Douglas*; *Jepson*, Fl. W. Mid. Cal. 345 (1901). Var. SERPENTINA *Jepson*. *S. serpentina* *Elmer*, Bot. Gaz. 41:312 (1906), type loc. Portola, San Mateo Co., *Elmer* 4498.

7. *S. nevadensis* Wats. SIERRA SANICLE. Low plants, with several spreading peduncles 1 to 6 (or 9) inches long arising basally or from the very short stem; leaves about 1 inch long, on petioles as long or twice as long, ternate, the divisions with distinct petiolules, oblong-ovate to roundish in outline, 3 to 5-lobed with the segments again lobed or toothed; rays 3 to 10 in an umbel, scarcely 1 line to 1 inch long, the bracts pinnatifid, leaf-like; bractlets small, oblong, acute, more or less united; flowers yellow, the sterile on pedicels 1 to $1\frac{1}{2}$ lines long; fruit tuberculate, the tubercules ending in hooked bristles.—Middle altitudes in the mountains, 5000 to 6000 ft.: San Bernardino Mts. and northward through the Sierra Nevada to Modoc and Siskiyou Cos. May-June.

Locs.—Long Point, San Bernardino Mts., *Parish*; Bear Mt., Tehachapi Range, *Jepson* 7176; Tahoe, Placer Co., *Sonne*; Prosser Creek near Truckee, *Sonne*; Forestdale, Modoc Co., *Baker & Nutting*; Deep Creek, Warner Mts., *L. S. Smith* 1124; Humbug divide, Siskiyou Co., *Butler* 623; Devils Backbone, w. Siskiyou Co., *Jepson* 2068.

Var. GLAUCA *Jepson* n. var. Leaves glaucous, very finely divided.—Rocky slopes, Pah Ute Pass, *Purpus* 5093 (type); Middle Tule River, *Purpus* 1804.

Refs.—SANICULA NEVADENSIS Wats. Proc. Am. Acad. 11:139 (1876), type from Plumas Co., *M. E. P. Ames*, *Lemmon*. Var. GLAUCA *Jepson*.

8. *S. septentrionalis* Greene. Plants erect, 6 to 12 inches high; peduncles few, divaricately spreading, scattered along the stem; leaves 1 to 2 inches long; fruit 2 lines long; otherwise like No. 7.—Montane, 5000 to 7000 ft.; Sierra Nevada (Tulare Co. to Siskiyou Co.); high North Coast Ranges. Northward to British Columbia.

Locs.—Colony Mill to Marble Fork, *Jepson* 656; Big Valley Mts., *Baker & Nutting*; Shackelford Creek, Siskiyou Co., *Buller* 54, 1778; Dorleska, Trinity Co., *Hall* 8587; Trinity Summit, *Jepson* 2046; South Yolo Bolly, *Jepson*.

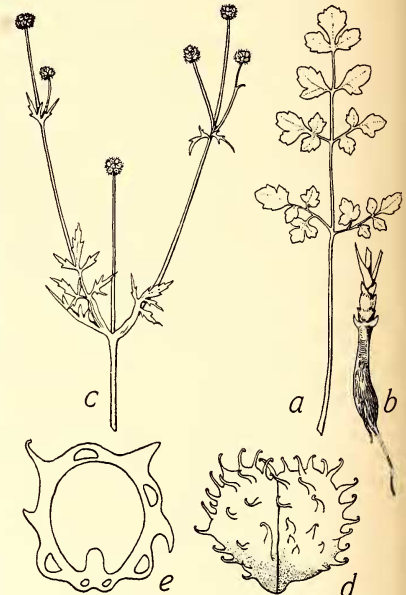
Refs.—SANICULA SEPTENTRIONALIS Greene, *Erythra* 1:6 (1893), type loc. Chase River, Vancouver Isl., *Macoun*; Wolff in Engler, *Pflzr.* 4:223:75, fig. 14 (1913). *S. divaricata* Greene, *Erythra* 3:64 (1895), type loc. Castle Peak, Nevada Co., *Greene*.

9. *S. bipinnata* H. & A. POISON SANICLE. Fig. 7. Stem from an elongated tuber-like root, erect, usually simple below, $\frac{3}{4}$ to 2 feet high; herbage with a strongly aromatic odor; leaves chiefly basal, 2 to 4 inches long, twice or thrice

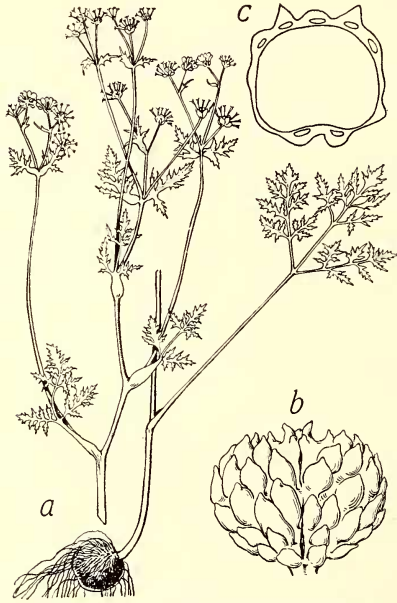
pinnate, the ultimate divisions obovate or oblong, 3 to 4 lines long, not decurrent; umbel with 3 or 4 rays and leaf-like bracts; flowers yellow; the heads 2 lines in diameter and subtended by several small more or less united bractlets; fruit tuberculate, the tubercles tipped with stout hooked bristles.—Shady woods in the low hills, Coast Ranges and Sierra Nevada. Apr.

Locs.—Sacramento Valley and Coast Ranges: College City, Colusa Co., *Alice King*; Putah Creek, nw. Solano Co., *Jepson*; Araquipa Hills, w. Solano Co., *Jepson*; Stanford, *C. F. Baker* 496; Paso Robles, *Barber*. Southern California: Ojai Valley, *Hubby* 16; Pasadena, *McClatchie* 1. Sierra Nevada: Rowen, Tehachapi Mts., *Jepson* 6743 (ultimate divisions coarse) Coulterville trail, Mariposa Co., *Congdon*; Stony Creek, Amador Co., *Hansen* 1513; Oroville, *Heller* 10707; Cabbage Patch, Yuba Co., *Jepson*.

Refs.—*SANICULA BIPINNATA* H. & A. Bot. Beech. 347 (1840), type from Cal., *Douglas*; *Jepson*, Fl. W. Mid. Cal. 346



7. *Sanicula bipinnata* H. & A.; a, leaf $\times \frac{1}{2}$; b, root $\times \frac{1}{2}$; c, fr. branchlet $\times \frac{1}{2}$; d, fr. $\times 4$; e, sect. carp. $\times 7$.



8. *Sanicula tuberosa* Torr.; a, habit $\times \frac{1}{2}$; b, fr. $\times 7$; c, sect. carp. $\times 10$.

2500 feet and up to 5000 feet, Coast Ranges and Sierra Nevada, southward to San Diego Co. and Lower California.

(1901); Wolff in Engler, Pflzr. 4²²⁸:77, fig. 15 (1913).

10. *S. tuberosa* Torr. TURKEY PEA. Fig. 8. Stem from a globose tuber, 5 to 9 (or 14) inches high, simple or divided at or near the surface of the ground into 2 to 5 long peduncle-like often divergent branches, each irregularly di- or trichotomous, the divisions ending in 1 to 4-rayed umbels and commonly with pedicelate heads in the forks; leaves once or twice ternate, then pinnatifid, usually very finely dissected into acutish segments; involucre of leaf-like bracts; involucre of small ovate or lanceolate partially united bractlets; heads 2 to 3 lines broad; flowers yellow, the sterile on pedicels 1 to 2½ lines long; fruit flattened laterally, tuberculate but not at all bristly, 1 line long.—Rocky or gravelly slopes in the foothills, 500 to

(To be continued)